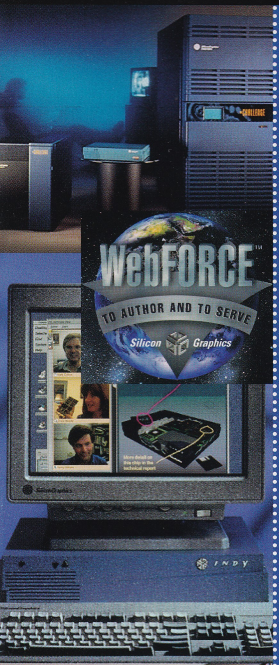
Silicon Graphics
Computer Systems



Welcome to the Family

Silicon Graphics is the world's leading supplier of high-performance visual computing systems. Our systems span the entire spectrum of price and performance, from the affordably priced Indy™ workstation to the CHALLENGE® server, a multiprocessing supercomputer designed to handle the very largest and complex compute and database problems, to the Onyx™ supercomputer, the ultimate in interactive graphics workstations.

All of Silicon Graphics® UNIX system-based workstations, servers, and supercomputers provide state-of-the-art technology in visualization, 3D, color, sound, and multimedia. The Silicon Graphics product line is also binary compatible and provides superior networking and connectivity solutions in a heterogeneous environment, which allows data sharing among many system types.

Silicon Graphics' extensive collection of software applications and tools, coupled with the compute power of the MIPS® RISC microprocessor, allows the end user and developer to maximize productivity and promote workgroup collaboration to create powerful and innovative solutions.

see what's possible

October 1995

Indy

The Indy workstation is the entry point to the Silicon Graphics product line. Indy offers full-featured digital media coupled with software-based 3D graphics and the MIPS R4000® family of processors with an extremely fast system architecture. Indy allows users to incorporate sound, video, and 3D graphics into their work and collaborate interactively in workgroups. An affordable price/performance leader among entry-level workstations, Indy also achieves incredible application performance, is highly expandable and upgradable, and provides seamless integration into heterogeneous workgroups.

Processors **MHz**	R4600PC 133MHz	R4600SC 133MHz	R4400SC 200MHz
Primary Cache **Secondary Cache**	16K/16K –	16K/16K 512KB	16K/16K 1MB
Sys Bus	267 MB/sec	267 MB/sec	267 MB/sec
Memory **Max Internal Disk**	256 MB 4GB	256 MB 4GB	256 MB 4GB
AIM **SPECint92** **SPECfp92**	75.4 84.9 61	107.2 113.5 73.7	139.9 140.2 131.0
Slots	2 GIO	2 GIO	2 GIO

Graphics (8- or 24-bit)	R4600PC @133MHz	R4600SC @133MHz	R4400SC @200MHz
X Lines/sec	1.4M	1.5M	1.6M
3D Vectors/sec	563K	573K	912K
T-Mesh/sec (z)	38K	53K	88K
Screen Clear	3msec	3msec	3msec
DMA Pixel Xfer			
8-bit	53M	54M	56M
24-bit	41M	44M	46M

Performance Chart for Indy XZ Subsystem	
3D Lines/sec	920K
T-Mesh, Flat NO-Z/sec	402K
T-Mesh, GouraudZ, Lit/sec	180K
Quads, GouraudZ, Lit/sec	91K
Characters	240K
Screen Clear	9msec
Rectangle Fill Rate	40mpix/sec

Indigo²

Indigo²™ is the most powerful desktop workstation from Silicon Graphics, combining advanced CPU, breakthrough graphics, expandable digital medial architectures, and leading applications to deliver outstanding performance. Indigo² offers a broad range of graphics, including the new Indigo² IMPACT™ workstation, which combines high-speed 3D graphics with fully integrated imaging capabilities. The POWER Indigo²™ workstation, based on MIPS R8000™, brings supercomputing performance to the desktop. Expandability, massive internal data storage, and sophisticated video options make Indigo² a highly versatile workstation. Indigo² delivers unrivaled productivity gains in key industries—manufacturing, entertainment, visual simulation, chemistry, oil and gas, geographic information systems, medical imaging, and prepress.

	Indigo²	**Indigo²**	**Indigo²**	**POWER Indigo²**
Processors **MHz**	R4400 175 MHz	R4400 200 MHz	R4400 250MHz	R8000 75MHz
Primary Cache **Secondary Cache**	16K/16K 1MB	16K/16K 2MB	16K/16K 2MB	16K/16K 2MB
GIO Sys Bus	267MB/sec	267MB/sec	267MB/sec	267MB/sec
Memory **Max Internal Disk**	384MB 12GB	384MB 12GB	384MB 12GB	640MB 12GB
AIM** **SPECint92** **SPECfp92** **DP Linpack 1000x1000**	118 123 116 51	140 145 136 59	160 176 165 87	124 114 276 231

Graphics (All CPUs)	**XL*****	**XZ**	**Indigo² High IMPACT™**	**Indigo² Maximum IMPACT**
CDRS Viewset Composite	–	–	26.15	42.59
Data Explorer Viewset Composite	–	1.64	7.36	12.71
Design Review Viewset Composite	–	–	5.07	7.54
Gouraud Tri Strips	68K	315K	1.1M	2.2M
Lit Gouraud Z Tri Strips	50K	176K	760K	1.5M
Lit Textured Gouraud Z Tri Strips	–	–	560K	1.1M
Lit Gouraud Z Independent Quads	18K	65K	300K	600K
Gouraud Fill (pixel/sec)	89M	37M	120M	240M
Textured Gouraud Z Fill (pixel/sec)	–	–	68.5M	137M

* Preliminary
** Uncertified
*** XL graphics performance measured with 200MHz R4400 processor

Reality Station, Onyx, POWER Onyx

Reality Station™, Onyx, and POWER Onyx™ graphics supercomputers combine the multiprocessing power of a supercomputer with the world's most advanced graphics architecture. Onyx uses the latest symmetric multiprocessing technology to provide unmatched graphics and compute performance in scalable and expandable deskside and rack systems. Onyx integrates all of the key elements of advanced graphics application generation in one powerful system for real-time applications in:

- Virtual Prototyping/CAD
- Image Processing
- Scientific Visualization
- Visual Simulation
- Film/Video/Broadcast

	Reality Station	Onyx	POWER Onyx
CPUs	1	2-24	1-12
Processors	R4400	R4400	R8000
MHz	250MHz	250MHz	90MHz
Primary Cache	16K/16K	16K/16K	16K/16K
Secondary Cache	1MB	4MB	4MB
Sys Bus	1.2 GB/sec	1.2 GB/sec	1.2 GB/sec
Memory	64MB to 2GB	64MB to 2GB	64MB to 16GB
I/O MB/sec	1x320	4x320	4x320
Max Internal Disks(non-RAID)	516 GB	2 TB	2 TB
-RAID5	2.1 TB	6.3 TB	6.3 TB
SPECint92 (per CPU)	180.2	180.2	132.2
SPECfp92 (per CPU)	177.5	177.5	396.1
Slots	3 VME 64	2-8 HIO	2-8 HIO
	—	3-23 VME	3-23 VME

Graphics (All CPUs)	EX	VTX	RealityEngine™
T-Mesh/sec	600K	1.0M	1.5M
T-Mesh Textured	2K	600K	988K
T-Mesh Gouraud Z, Lit	370K	813K	1.0M
Pixel Fill, smooth Z	100M	90M	90-360M
Pixel Fill, textured aa	N/A	N/A	55-230M
Color	24-bit RGB	48-bit RGBA	48-bit RGBA
Max bits/pixel	24	256	256-1024
Texture Memory	N/A	4 or 16MB	4 or 16MB
Frame Buffer Size	8MB	40MB	40 to 160MB

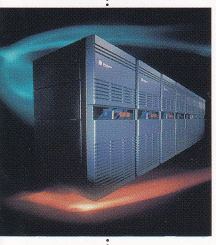
CHALLENGE

The CHALLENGE family of network servers combines the world's most advanced technology with affordable prices and levels of performance previously associated with mainframe computers. The CHALLENGE architecture is both scalable and fully expandable, and is specifically designed to manage massive databases and perform comprehensive storage management. CHALLENGE also excels in a variety of client/server environments due to superior networking and connectivity solutions. With unparalleled performance, seamless integration in heterogeneous environments, and binary compatibility across the product line, the CHALLENGE family can easily handle the most complex data management task.

	S	DM
CPUs	1	1-4
Processors	R4600/R4400	R4400
MHz	133/175/200MHz	150MHz
Primary Cache	16K/16K	16K/16K
Secondary Cache	1 MB	1 MB
Sys Bus	267MB/sec	1.2GB/sec
Memory	32 to 256MB	64MB to 6GB
I/O Bus Bandwidth	1x267MB/sec	3x320MB/sec
Max Disk (non-RAID)	157GB	1.5TB
-RAID5	—	4.7TB
SPECint92 (per CPU)	84.9/122.6/140.2	93.7
SPECfp92 (per CPU)	61/115.5/131.0	97.1
LADDIS	841NFSops	2830NFSops

	L	XL
CPUs	2-12	2-36
Processors	R4400	R4400
MHz	250MHz	250MHz
Primary Cache	16K/16K	16K/16K
Secondary Cache	4 MB	4 MB
Sys Bus	1.2GB/sec	1.2GB/sec
Memory	64MB to 6GB	64MB to 16GB
I/O Bus Bandwidth	3x320MB/sec	4x320MB/sec
Max Disk (nonRAID)	1.5TB	2TB
-RAID5	4.7TB	6.3TB
SPECint92 (per CPU)	180.2	180.2
SPECfp92 (per CPU)	177.5	177.5
LADDIS	—	8806NFSops (12cpu)

POWER CHALLENGE



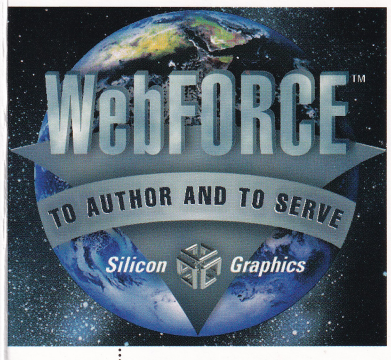
POWER CHALLENGE™ supercomputing servers have captured the leadership position in the high-performance computing market by providing the most cost-effective solutions for high demand, floating-point applications that require large memory, fast bandwidth, and varying I/O rates. Based upon the MIPS R8000 streaming superscalar RISC microprocessor, these servers deliver supercomputing performance at unprecedented low prices. POWER CHALLENGEarray™ combines the power of up to eight POWER CHALLENGE symmetric multiprocessing (SMP) supercomputing systems and is uniquely suited to solving the world's most complex supercomputing problems. POWER CHALLENGE GR combines the computational power of a supercomputer with the world's fastest interactive computer graphics to achieve new and faster ways of solving supercomputing problems with greater insight.

	L	GR
CPUs Processors MHz	1-6 R8000 75/90MHz	1-12 R8000 90MHz
Primary Cache Secondary Cache	16K/16K 4MB	16K/16K 4MB
Sys Bus	1.2GB/sec	1.2GB/sec
Memory I/O Bus Bandwidth Max Disk	64MB to 6GB 1.2GB/sec 4.7TB	64MB to 16GB 320MB/sec 6.3TB
SPECint92 SPECfp92 DP Linpack 1000x1000 SPECrate int SPECrate fp	111.5/132.2 310.8/396.1 948/1124MFLOPS * 10.8K/13.1K * 26.4K/37.2K *	132.2 396.1 308MFLOPS 25.5K *** 74.1K ***
Slots	5 VME 64 1-6 HIO	1-4 HIO 3-24 VME

	XL	Array
CPUs Processors MHz	2-18 R8000 90MHz	2-144 R8000 90MHz
Primary Cache Secondary Cache	16K/16K 4MB	16K/16K 4MB
Sys Bus	1.2 GB/sec	1.2 GB/sec
Memory I/O Bus Bandwidth Max Disk	64MB to 16GB 1.2 GB/sec 6.3TB	128MB to 128GB 9.6 GB/sec 50.4TB
SPECint92 SPECfp92 DP Linpack 1000x1000 SPECrate int, fp	132.2 396.1 3240MFLOPS ** 47.1K/148.9K **	132.2 396.1 TBD TBD
Slots	5-25 VME 64 1-8 HIO	40-200 VME 64 8-64 HIO

* POWER CHALLENGE L performance with 4 CPUs
** POWER CHALLENGE XL performance with 16 CPUs
*** POWER CHALLENGE GR performance with 8 CPUs

WebFORCE



The Silicon Graphics WebFORCE™ product line offers complete hardware and software solutions for professional Web authoring and high-performance Web serving. WebFORCE systems are powering the highest traffic sites on the Web, allowing businesses to reach their customers around the globe, 24 hours a day. With the WebFORCE authoring tools, these companies are making their messages more engaging with video, audio, images, and 3D graphics. WebFORCE CHALLENGE servers, complete with Netscape software, offer customers a scalable platform for database-intensive, media-rich Web application requirements.

	Authoring and Serving	Dedicated Authoring
	Indy	**Indigo²**
Processors	R4600™PC/R4600SC R4400SC	R4400
MHz	133/200MHz	200MHz
System Disk Memory	1GB 32MB	2GB 128MB
WebMagic™ content authoring	X	X
MovieMaster™ video compression software	X	X
Netscape™ Communications or Commerce Server Software	X	

	Dedicated Servers: CHALLENGE			
	S	**DM**	**L**	**XL**
CPUs Processors	1 R4600PC/ R4400SC	1-4 R4400	2-12 R4400	2-36 R4400
MHz	133/175/200MHz	150MHz	250MHz	250MHz
Memory Max Disk (nonRAID) -RAID5	32 to 256MB 157GB —	64MB to 6GB 1.5TB 4.7TB	64MB to 6GB 1.5TB 4.7TB	64MB to 16GB 2TB 6.3TB
Netscape Communications or Commerce Server Software*	X	X	X	X
Performance Co-Pilot*		X	X	X
XFS, NFS*		X	X	X

* Available as part of SMP server pack. Optional for CHALLENGE S. PCP, XFB, NFS, Optional for CHALLENGE S

Desktop Environment

Digital Media-Rich Collaboration Tools

The power to create and share information through visual computing and collaboration is at your fingertips. All of Silicon Graphics' desktop tools and applications maximize the use of rich digital media: text, image, audio, video, and 3D. Included with every Silicon Graphics workstation, the following desktop software and integrated Web-based collaboration tools enable you to create, communicate, and share rich content within and between organizations.

Indigo Magic™

An icon-based, drag-and-drop, GUI desktop environment that is tightly integrated with standard authoring, browsing, and collaborative applications. Indigo Magic provides a natural, intuitive interface while leveraging the power of your high-performance workstation.

Netscape Navigator™

The Web's leading browser for global information retrieval.

Mindshare™ OutBox

The first drag-and-drop Web publishing tool that enables every desktop to become a Web-based collaboration system in a heterogeneous environment. Simply drag and drop files to share them with any PC, Macintosh, Sun, or other platform that supports Web browsing.

WebMagic™

Author and edit Web documents in a WYSIWYG environment, eliminating the need to know HTML.

WebSpace™

Browse the 3D spaces of the Web with the industry's first commercially available VRML browser.

InPerson™

Real-time multiway conferencing from your desktop with interactive video, audio, 3D models, images, text, and more.

IRIS Showcase™

Create digital media-rich, highly interactive presentations using audio, video, 3D models, and more. Showcase can also export PostScript®, EPS, and Inventor and VRML 3D models.

MediaMail™

A SMTP/MIME-compliant electronic mail package that allows you to transport any size media file. The integration of MediaMail with the Indigo Magic desktop and Mindshare OutBox provides an environment that supports combined push/pull technology for sharing and distributing information.

Digital Media Tools

A suite of tools that allow you to enrich your communications with all forms of digital media. Tools such as MovieMaker, SoundEditor, and ImageWorks make manipulating movies, audio, and images as natural as working with text. This complete package of capture, edit, playback, and translation capabilities supports a broad range of formats including QuickTime™ for movies, AIFF for audio, and GIF, TIFF, and JPEG for images.

Development Libraries and Toolkits

Developer Magic™ for Application Development

Silicon Graphics offers a complete family of toolkits and libraries for developers who want to incorporate interactive 3D graphics and integrated digital media into their applications. These libraries and toolkits are binary compatible with a full line of the Silicon Graphics workstations, servers, and supercomputers.

RapidApp™

An object-oriented C++ application builder that lets developers build visual, media-rich Motif™ applications quickly and create reusable objects that save time on future projects.

OpenGL®

An industry-standard, multiplatform environment for developing 2D and 3D graphics and imaging applications.

Open Inventor™

An easy-to-use object-oriented toolkit for creating and using interactive 3D graphics in your applications.

ImageVision™

A high-performance and real-time image processing toolkit for creating, processing, and displaying images.

Performer™

A real-time graphics toolkit that enables applications to achieve maximum graphics performance from all Silicon Graphics workstations.

IRIS® Media Libraries

Libraries for integrating audio, video, movies, and speech into your application.

REACT™

Provides guaranteed real-time response to external events on all multiprocessor systems. Features include non-degrading priorities, linking processes to processors, and preventing UNIX activity on real-time processors.

ProDev™

A visual software development environment for debugging, performance tuning, and testing of C, C++, Ada, Fortran, and MP applications.

Industry-Specific Solutions

WebFORCE

WebFORCE is a line of integrated hardware and software for professional content creation and high-performance Web serving.

Indy Modeler™

The best value for mechanical design. It is the perfect solution for the design of components and small assemblies.

Developer Magic

Provides interactive tools for creating media-rich 3D applications.

SiliconPRESS

Publishing and print solutions for creative professionals as well as print production companies.

SiliconWorks™

Provides enabling technologies that deliver a competitive advantage to the manufacturing industry through interactive graphics, digital media, advanced visualization, and symmetric-multiprocessing. Silicon Works gives manufacturers the tools to develop better products and get them to market faster.

Silicon Studio™

Silicon Studio is dedicated to driving the creation of solutions for the entertainment community.

Silicon Exchange™

Silicon Exchange offers innovative solutions for the financial service industry.

Scientific Solutions

Silicon Graphics offers state-of-the-art solutions for the chemistry, medical, geoscience and GIS markets in the areas of visualization, compute-intensive 3D modeling, volume rendering, and image processing.

Third-Party Solutions

Silicon Graphics is the platform of choice for suppliers delivering leading-edge applications on UNIX platforms. Users can select from more than 3,000 applications ranging from the most sophisticated computer modeling applications to popular word processing and spreadsheet programs.

Compatibility

Client/Server Solutions

Silicon Graphics brings together the world's most powerful graphics workstations and the world's most scalable server solutions to deliver responsive collaborative computing, comprehensive data management, and efficient workflow solutions. A wide selection of network interfaces, state-of-the-art filesystem technology, mature symmetric multiprocessing, and advanced processor and hardware architectures combine to deliver a seamless, high-performance, open systems solution capable of processing the most extreme data requirements. Silicon Graphics applies the power of visual computing to make distributed system and network management fast and intuitive, whether you manage a work group with gigabytes of data or an enterprise with terabytes of data.

Standards-Based Environment

Silicon Graphics systems support all major UNIX standards and work seamlessly in heterogeneous environments:

- IRIX™ operating systems based on UNIX System V, Release 4
- MIPS ABI and API, SVID3 and SVR4 API, and POSIX
- TCP/IP, NFS v2 and v3
- OpenGL, X11R6, Motif 1.2.4 XOPEN/XPG4, FIPS 151-2
- Optional CDE from TriTeal Corp.
- Microsoft® Windows™ 3.1 environment from Insignia SoftWindows™ (standard on some platforms)

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